

CTA INTERNATIONAL

Guns and Ammo Symposium

Technology

Applicability

Program

Risk

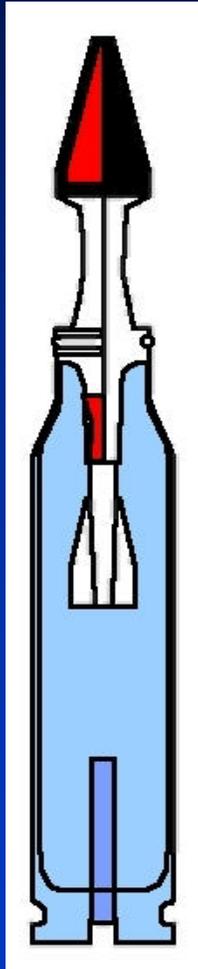
System Integration

Precision and Target Effect



Cased Telescoped Technology

Principle of Technology 'Telescope' the ammunition



30% saving in volume for the same performance

30% more performance for the same volume

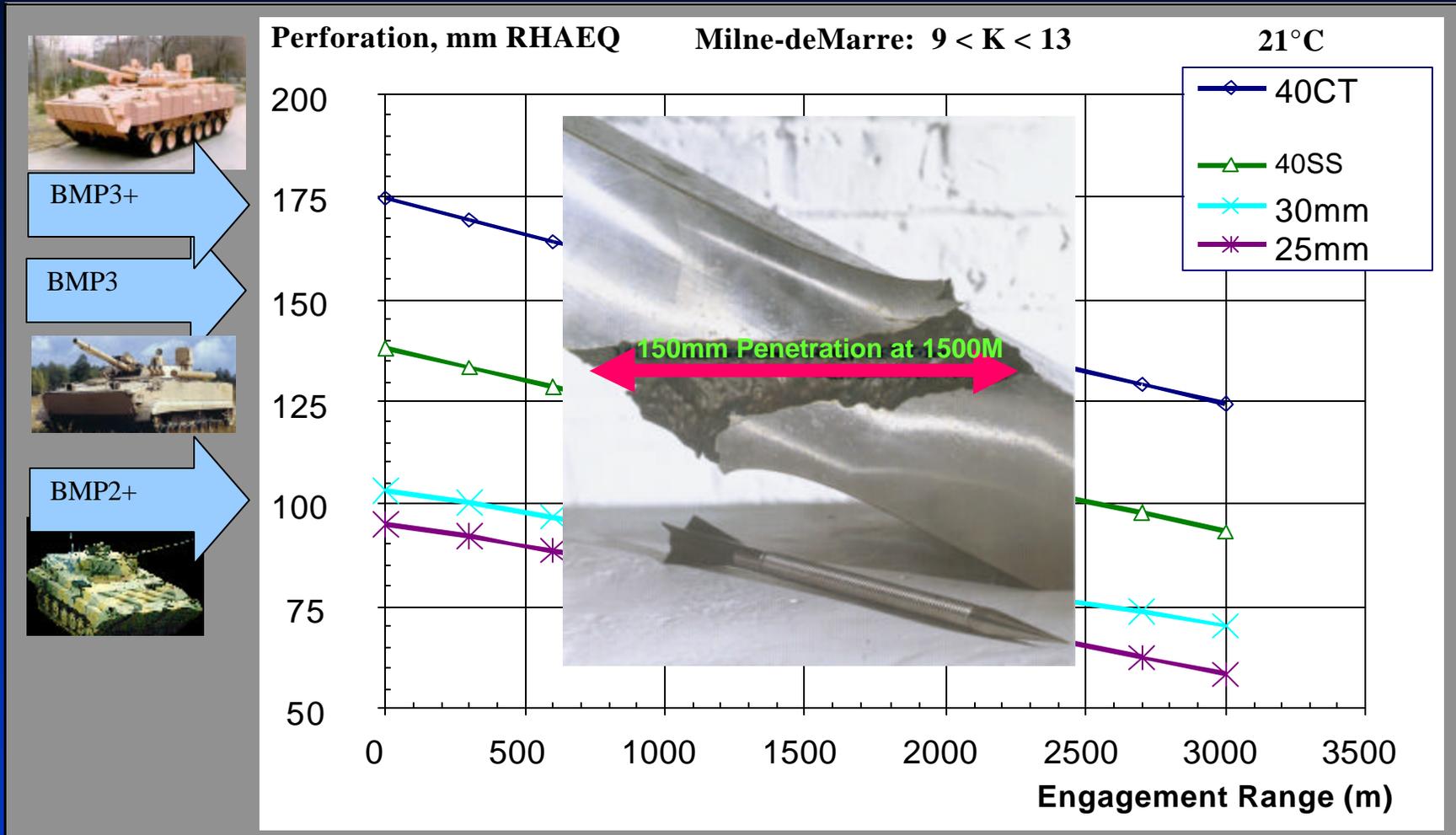


Cased Telescoped Technology

Centre of Feed



APFSDS Penetration

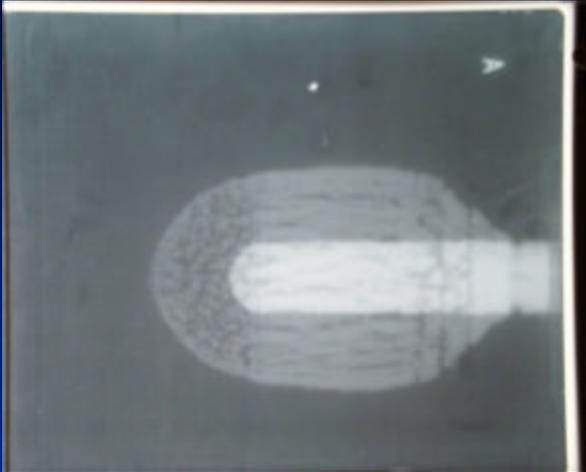


Comparison HE/GPR Rounds

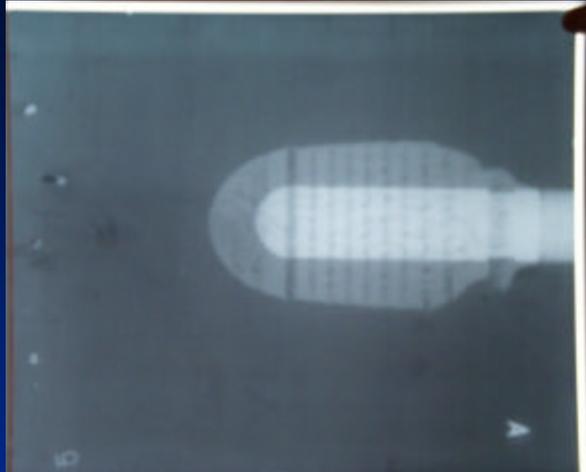


	Projectile Mass	Mass Steel	HE Mass	MAE m2	No Rnds (30mx30m SWIS)
25mm	185g	120g	24g	15m2	45
30mm	360g	240g	34g	28m2	20
40mm CT	1000g	750g	120g	90m2	6

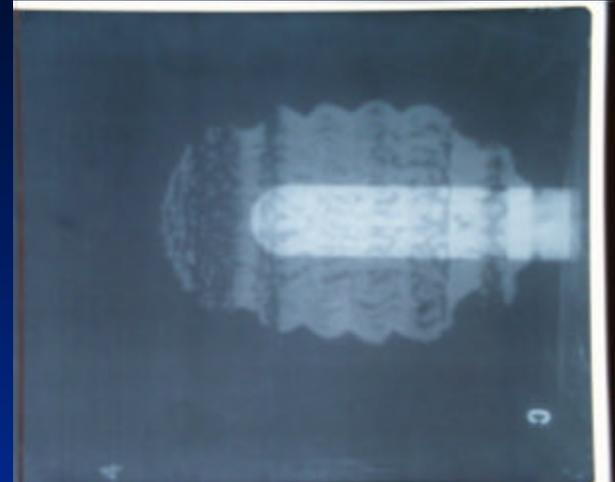
Air Burst Fragmentation Trials



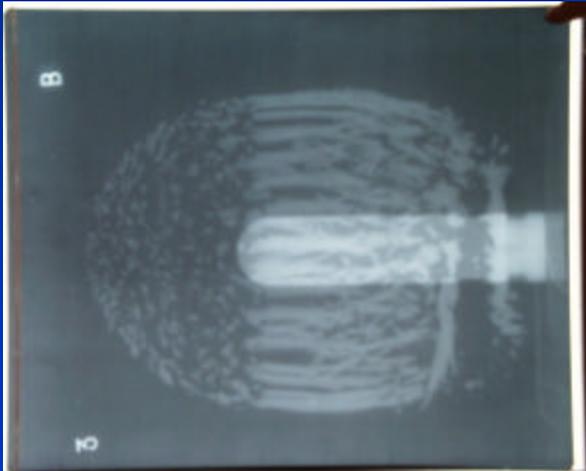
40mm Type 1
Non Optimised



40mm Type 2
Optimised A/Pers



40mm Type 3
Optimised A/Pers+Material

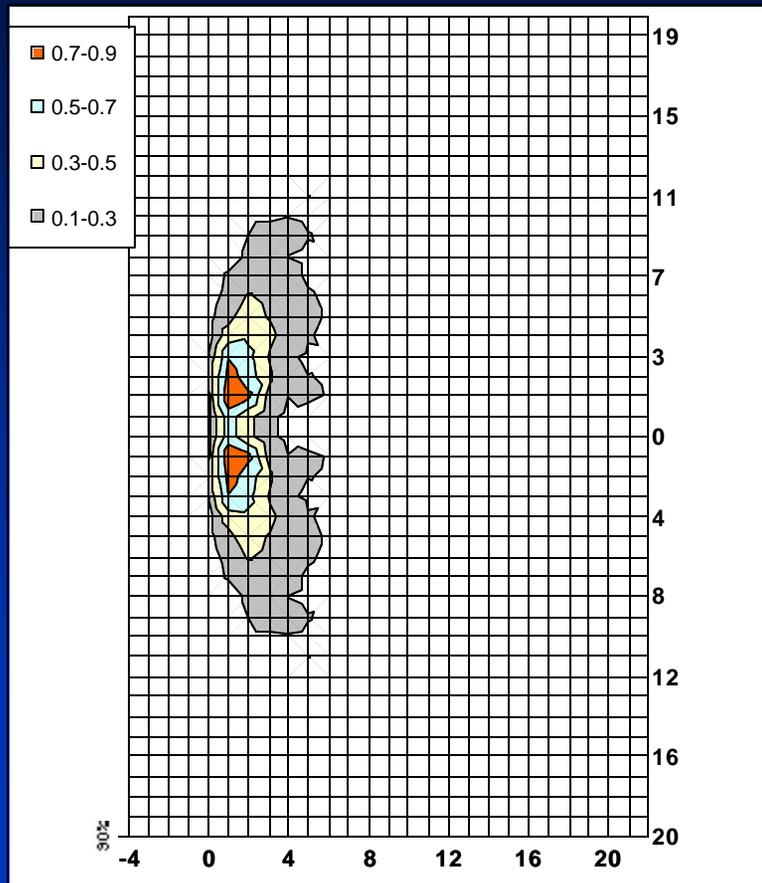


Air Burst Fragmentation Trials

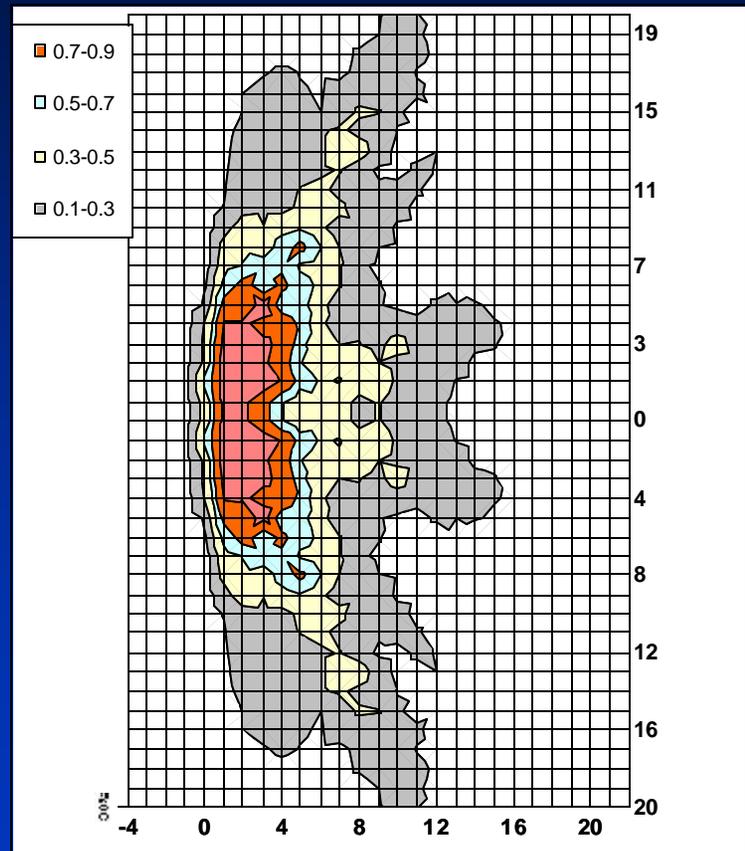


Comparison of Lethal Areas (Single Round P.Incapacitation Crisat Prone)

30mm Airburst



40mm GPR Airburst



Weapon LRU's and Lifer Items

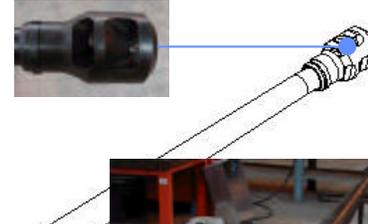
LRU 6 Electronics



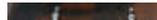
LRU 7 Cabling



LRU 5 Muzzle Braks



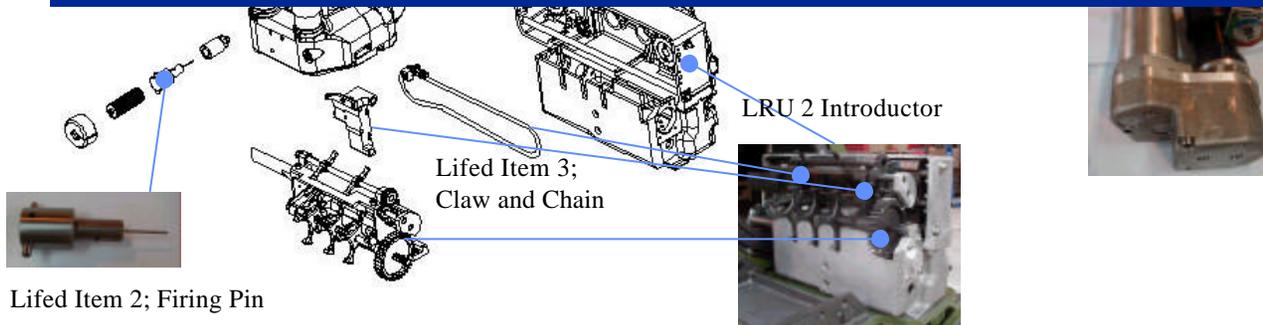
LRU 4 Recoil Units



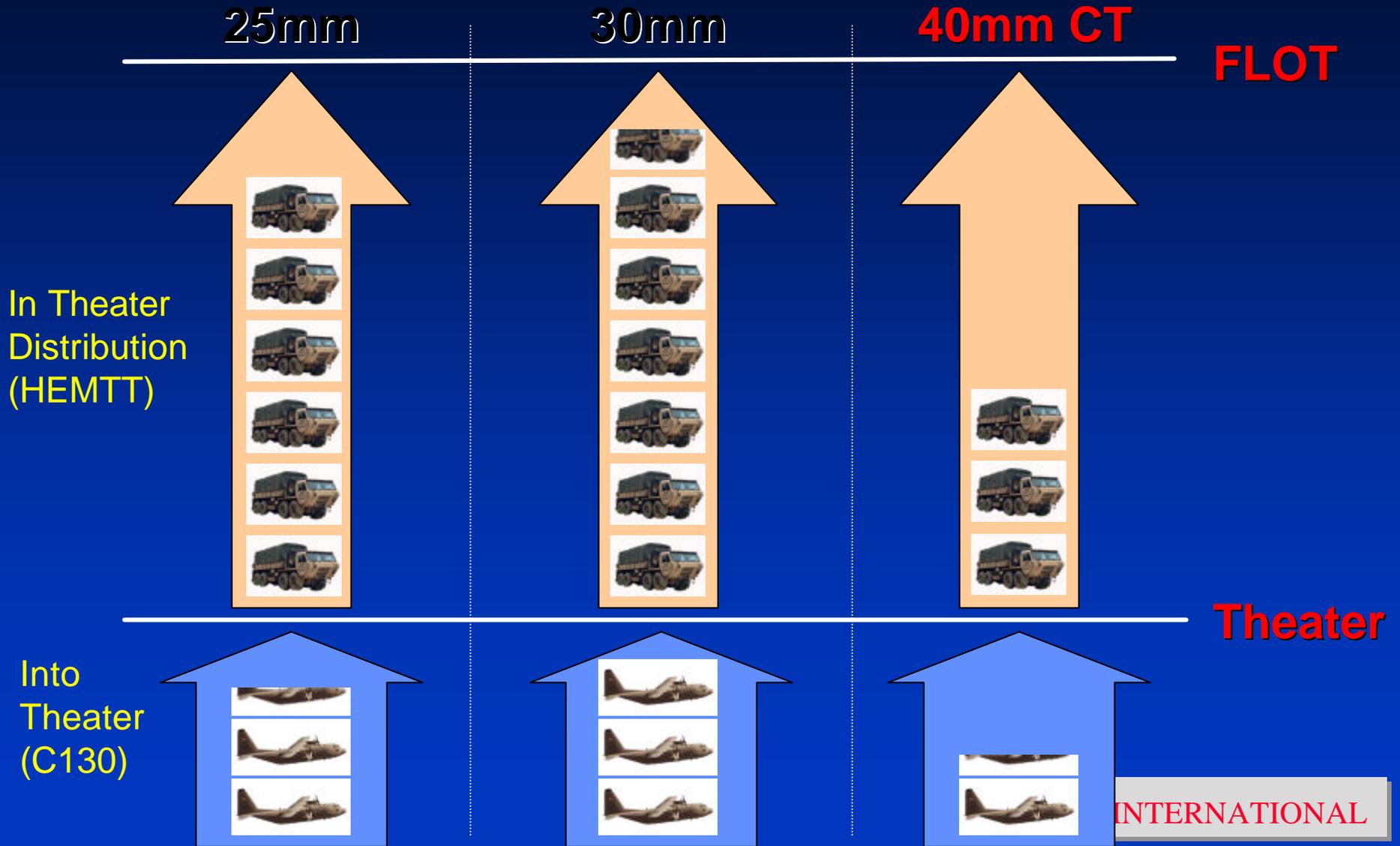
LRU 1



- Reduced Logistics Footprint
- Facilitisation geared for customer needs
- Demil process designed in
- Reduced Training Needs
- Reduced Wastage in Service
- Gun, Ammunition and AHS optimised as a System



Ammunition Logistics





2003 / 2004 Programme



Customer Commitment

- May 02 OFCP reports that 40mm CTWS is the solution
- UK will commit to 40mm CTWS for Warrior and FRES variants
- UK and France are funding risk reduction of CTAI programme

2003/4 Programme \$11.5M based on customer objectives

Customer committed to share deliverables with other nations

Interoperability with FRES and EBRC encouraged at sub system level



Trade Studies 1997 –2002

UK MoD – Tracer Medium Cal req't
Lancer Prime - Tracer/Scout req't
SIKA Prime – Tracer/Scout req't
Joint UK/US Program Office
French MoD Cannon studies
UK MoD Objective Cannon Program

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UK Programme

- Key Tasks:
 - Achieve TRL 7 for system by Dec 2004 (In service readiness)
 - Demonstrate air burst fuzing during 2004
 - Demonstrate 40mm CTWS in operational environment (Warrior)
 - Demonstrate Feed system in operational firing environment



In Service Readiness for UK MoD

- Demonstrate by Dec 2004 TRL 7
 - Weapon
 - Feed System
 - APFSDS
 - GPI
 - GPR with Impact Fuze

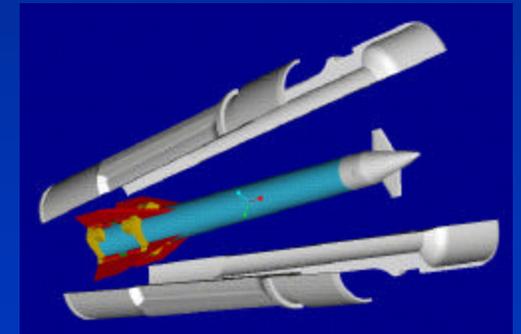
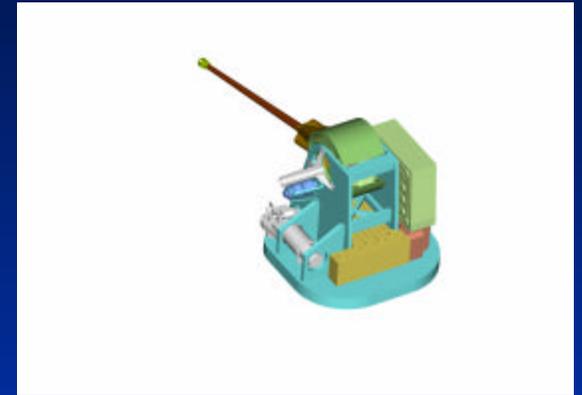
Warrior
Based



- ✓ Platform in service
- ✓ Realistic Environment
- ✓ Transformation of training benefits
- ✓ Lessons learned will read into FRES

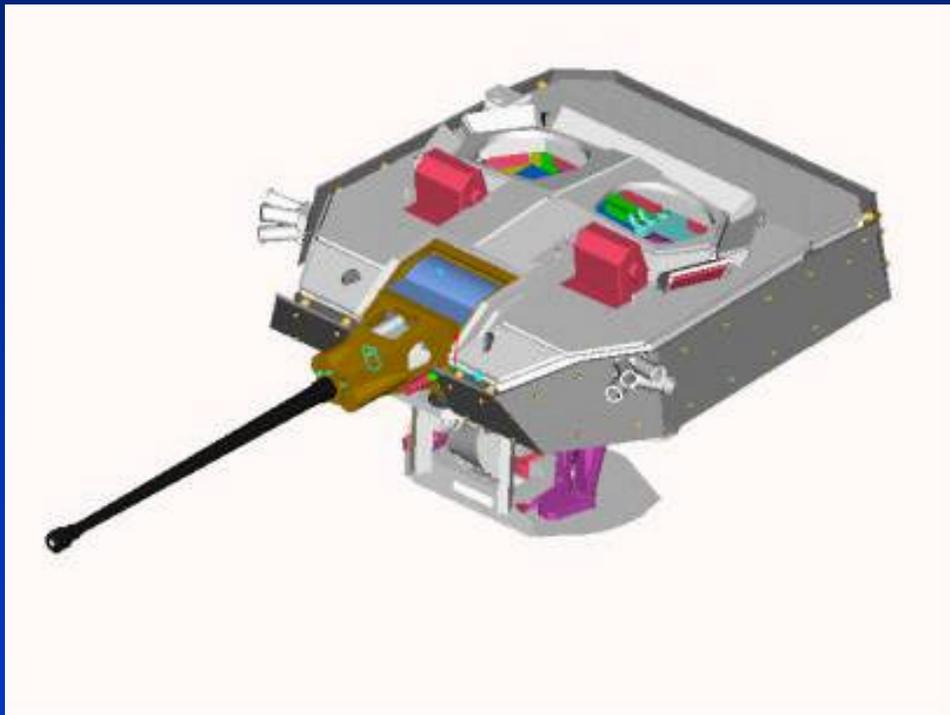
Additional Activities 1

- Triple Feedsystem
- 80° Elevation range on weapon
- Turret Integration
- GPR Airburst Fuze
- Weapon Navalisation
- CTGP Advancement



Additional Activities 2

- Weapon Performance to be evaluated in a turret envelop
- To be based on Warrior turret and (ex Lancer) unmanned turret



Lancer Remote Turret

CTAI
Warrior Prototype 2
Turret

RISK?

40mm CTWS Maturity

- Over 6000 tactical rounds fired
- Weapon qualified by UK Ordnance Safety Group
- Ammunition qualification 2003
 - Two tactical rounds
 - One Training Practice
- Ammunition IM Compliant (Stanag 4439)
- Intensive endurance trials 2003/4
Chamber/Breech Ring tested to Destruction
- Full system turret testing early 2004
 - 2 Man and Unmanned



System Integration

CTAI Integration Background

LANCER Gun and Ammunition Handling



SIKA Gun and Ammunition Handling

BRADLEY Fighting Vehicle Integration



WARRIOR Infantry Fighting Vehicle Integration

40mm CTWS Turrets

**Conventional 2 Man
1 man gun operation**



**Fully integrated Weapon
Dual APFSDS/HE Feed System
Dual Axis Stabilisation
Man Machine Interface
Improved Protection**

**Unmanned remote
Weapon Station**

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Integrated CTWS - Platforms

UNMANNED



UK/France

- FRES
- Warrior
- VBCI
- EBRC



MANNED

EXPORT

Warrior Turret Programme



Customer Drivers

- **Lowest Cost**
- **Adequacy for the Mission**



‘The offensive manoeuvre’

Solution Offered by this Programme

- 40mm CTWS
 - Automatic Cannon
 - Two natures of ammunition, GPR and AP
 - Automatic feedsystem
- Dual Axis Stabilised Power Drive System
- Improved Armour Protection
 - Protected against 14.5mm AP B32 @PB (eq BS41 @200m) 360°
 - Upgrade potential against 30mm APFSDS over frontal arc

Warrior Turret STATUS 15th March 2002

- **Prototype 1 Turret completed; First fired Feb 2002**
- **Warrior fit and vehicle turret interfaces verified**
- **MOOG elevation drive fitted**
- **Definition of Proto 2 turret complete**
- **Proto 2 turret currently in manufacture**

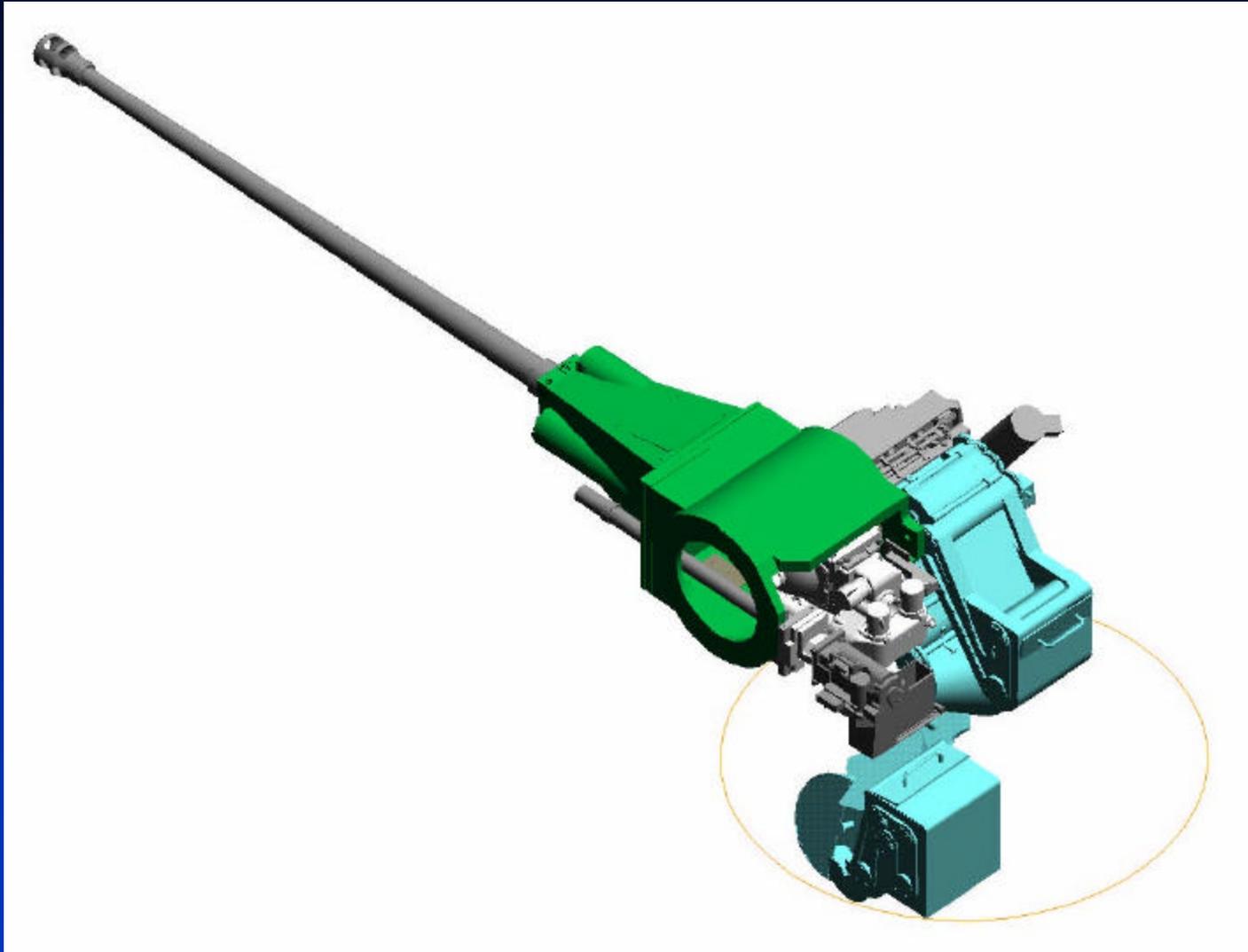


Prototype 2 Testing starts Sept 2003

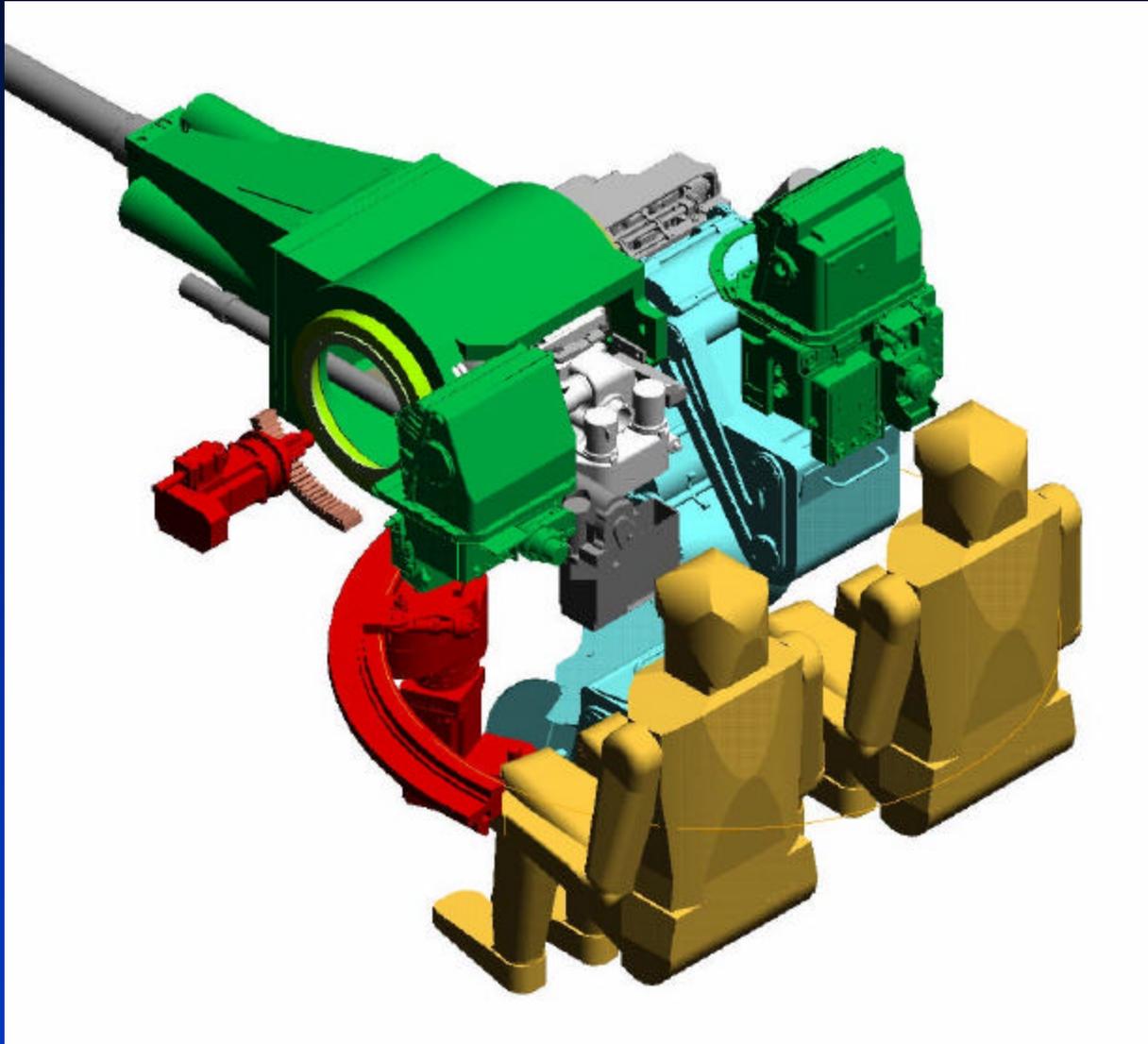
Warrior St Andrews Firing Point Lulworth Feb 02

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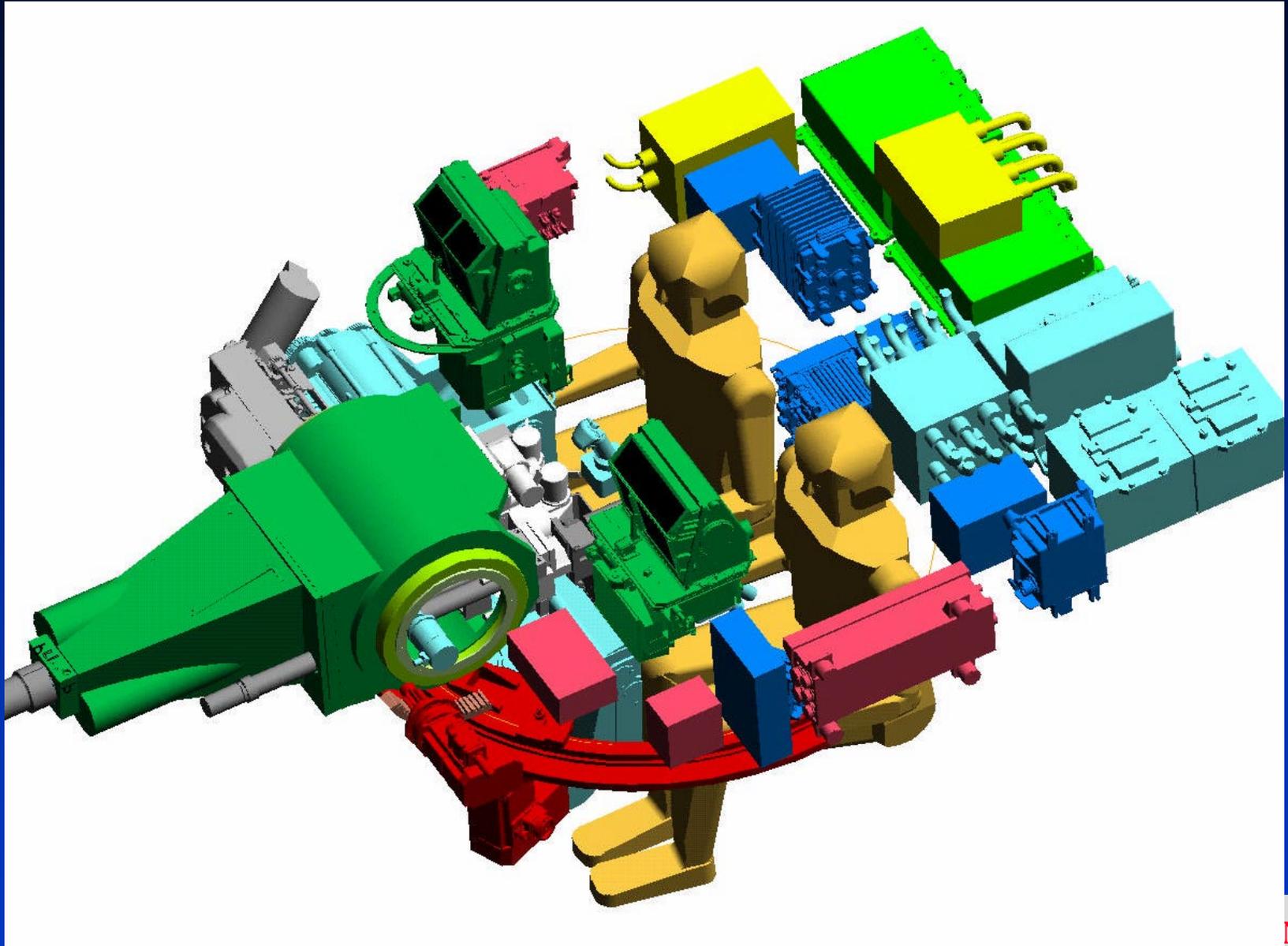
Warrior Integration



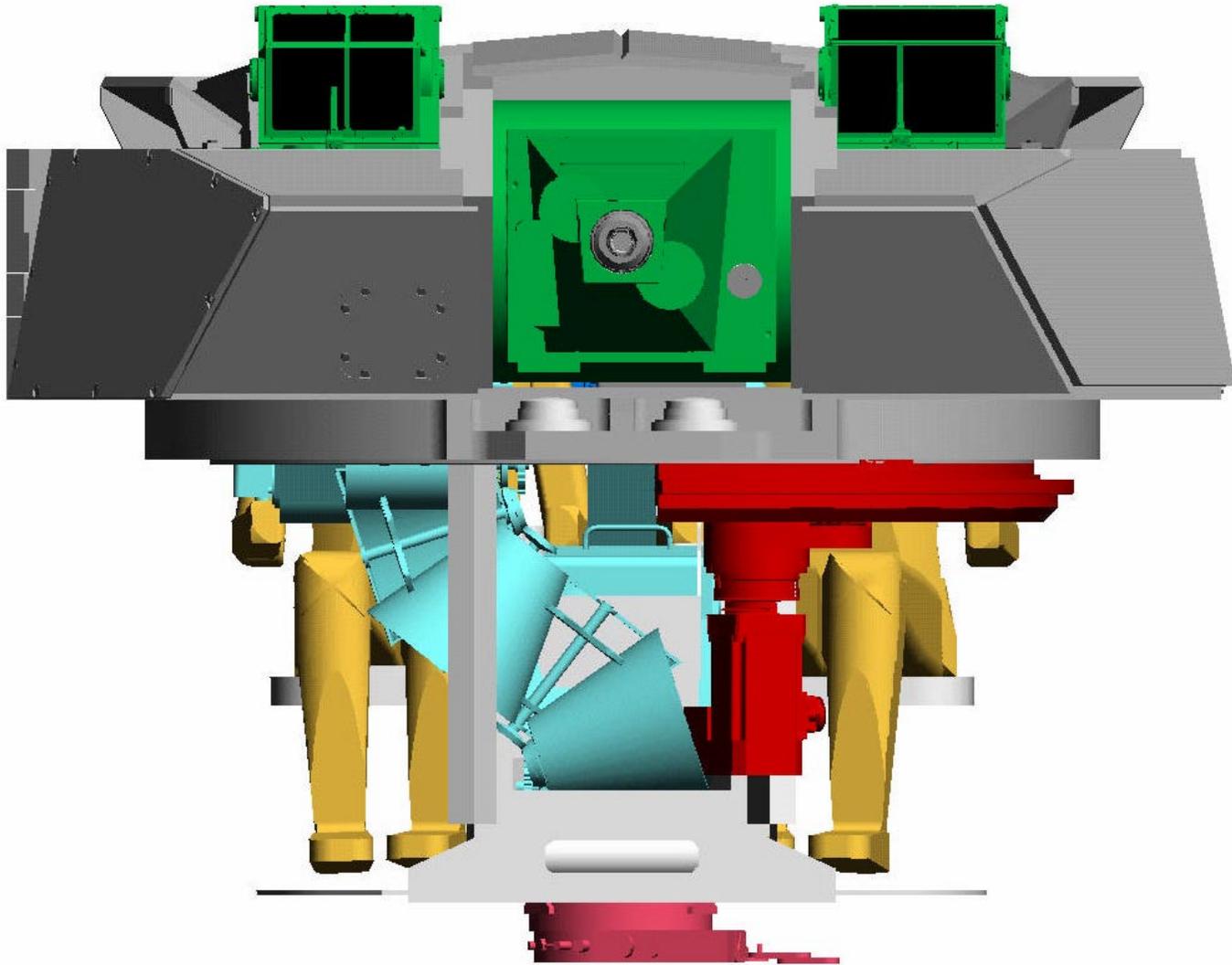
Warrior Integration



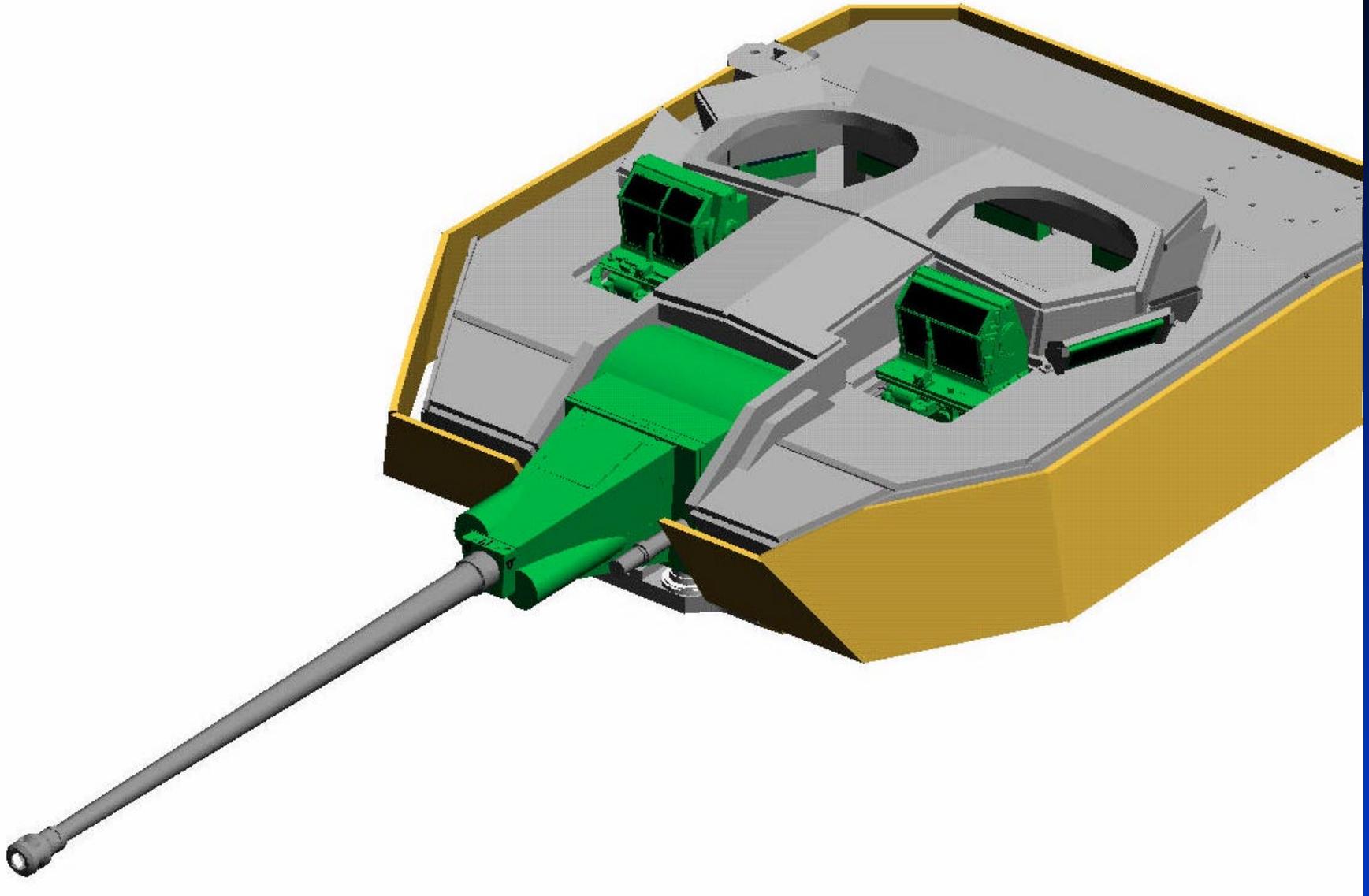
Warrior Integration



Warrior Integration



Warrior Integration



Conclusions

- 40mm CTWS is on track for insertion into Warrior upgrade 2006
- 40mm CTWS will be ready as a System for FCS/FRES FUE
- 40mm CTWS is transformational
 - Lethality
 - Logistics
 - Training



40mm CTWS production start January 2005

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